MUSKEG AS SHARP-TAILED GROUSE HABITAT

BY HAROLD C. HANSON

IN their review paper on the ecology and distribution of the Sharp-tailed Grouse, *Pedioecetes phasianellus*, the Hamerstroms (1951) pointed out that little is known about the life history and ecology of the northern races (*caurus*, *kennicottii*, and *phasianellus*). In 1947, while investigating the Canada Goose in the extensive muskeg country west and south of Hudson Bay and James Bay, I had opportunity to study briefly a dancing ground of the race *phasianellus*. The nature of this dancing ground was so different from the commonly known types that it appeared to offer at least a partial explanation as to how this race has been able to adapt itself to a muskeg environment. While only one dancing ground was found, it is difficult to believe that the specialized habits of the one group of breeding birds observed are not common to other flocks of the region. Other general conclusions presented here are based on extensive low altitude flights, both in 1947 and again in 1949, numerous penetrations of the muskeg on foot, and a fairly extensive plant collection made in the region.

For support of field operations while in the James Bay-Hudson Bay region, I am happy again to acknowledge grants by the Arctic Institute of North America and Ducks Unlimited, which made the work possible. The manuscript was improved by the helpful criticism and suggestions given by Ralph E. Yeatter and Frederick and Frances Hamerstrom.

The range of the Sharp-tailed Grouse extends from central western Quebec west to Alaska and south to northern California, Utah, southwestern Colorado and central Wisconsin. Such a widespread species, which is not migratory in the usual sense of the word, must of necessity be sufficiently adaptable to meet its requirements in the diversified habitats found in such an extensive range. Some adaptations have probably become genetically fixed, a consequence which at least in part is likely to be paralleled by phenotypical differences (Mayr, 1950). At present six subspecies of Sharp-tailed Grouse are recognized.

The habits of the race *campestris* in Wisconsin best serve as a standard upon which to evaluate the Ontario observations. In early settlement times the sharp-tails of the southern Wisconsin prairies showed a preference for oak openings (Schorger, 1944); its original range within the forested portions of central and northern Wisconsin is believed to have been in and around edges of open bogs and marshes and on burns (Hamerstrom *et al.*, 1952). The observations made by me in northern Ontario in 1947 indicate that the designation of open bogs as an important original sharp-tail habitat in Wisconsin is undoubtedly correct. Because knowledge of the northern

races of Sharp-tailed Grouse has been so scanty, it does not appear to have been fully realized that muskeg apparently constitutes one of the primary habitats in the range of the nominate race, *phasianellus*, which breeds south of the timberline on both sides of Hudson Bay and James Bay from central western Quebec west to northeastern Manitoba south to about the Canadian National Transcontinental Railway in Ontario (Hellmayr and Conover, 1942; Snyder, 1935). The Sharp-tailed Grouse has been reported from all major sectors of the Hudson Bay lowlands or the "Great Muskeg," in some years being particularly abundant (Manning, 1952).

Snyder (1935) stated that the race *phasianellus* "in habits and behavior, is still an open-country bird; it still attempts to be a 'prairie dweller' in the openings of the forest in the north. But in such an area they must be rather irregularly established here and there in suitable habitats, which are more or less restricted locally and *definitely hemmed in by the flanking forest*" (italics mine). With more information available on the ecology of the "Great Muskeg" of northern Ontario, the above statements can now be modified considerably insofar as they apply to the District of Patricia.

Snyder's Map 1 (1935) indicates that the eruption and subsequent emigration of sharp-tails in 1932 occurred from the region south and west of James Bay and Hudson Bay, an area which coincides (without its western limits being delineated) almost exactly with the limits of the lower two-thirds of the Palaeozoic Basin. The latter, more commonly referred to as the Hudson Bay Lowlands (Anon., 1947), constitutes a 125,000 square mile area which supports, almost equivalent in size, perhaps the single greatest continuous tract of muskeg of its kind in the world. Aerial flights made over this area revealed that except for the south end of James Bay, this area is only partially or poorly timbered with stunted tamarack and black spruce, and these occur mainly in blocks of variable size (fig. 1). About five fairly distinct muskeg types (Hanson and Smith, 1950) can be recognized.

Instead of fairly scattered isolated tracts of suitably open habitat in otherwise forested country, the essentially open character of this muskeg furnishes perhaps the largest single continuous block, or series of interconnecting blocks, of habitat available to the species in the northern sector of its entire range. This is not to imply that every square mile of this muskeg is suitable for sharp-tails—a species is seldom able to occupy all areas of its range; there are innumerable lakes and areas of floating vegetation that occupy a considerable portion of this muskeg. Nevertheless, the sheer size of this breeding range coupled with a cyclic peak must in part account for the unprecedented numbers of these birds that occurred over northern Ontario and easternmost Quebec in the emigration of 1932 (Snyder, 1935).

For a species in which communal courtship is carried out, the presence

or absence of a suitable dancing ground may be the factor deciding whether an otherwise satisfactory range is inhabitable. In Wisconsin, the race *campestris* resorts to grassy knolls, buckwheat stubble fields, and open marsh (Hamerstrom, 1939). Grange (1948) reports that sharp-tails utilized booming grounds similar to Prairie Chickens (*Tympanuchus cupido*), but "exhibited an even greater preference for wet marshes," in one case utilizing a solid mat of grass which lay over eleven inches of water. In Utah (Hart,

FIG. 3. Sedge tussock used by Sharp-tailed Grouse cock as a pedestal on which to display. See text for locality and date.

Lee, and Low, 1950), dancing areas used by the race *columbianus* "are usually found on points of higher elevations, ranging from small knolls to high hills, and usually in a weed-grass cover type."

From these accounts and others in the literature (Bent, 1932) it seems apparent that most dancing grounds possess either little cover or cover that is most commonly of low grasses or sedges which does not prevent the grouse using them from readily seeing one another. A fairly firm substrate also seems to be desired. Both factors may account for the fact that small knolls are often chosen for dancing grounds. Indirect confirmation of the importance of the visual aspect of dancing grounds can be derived from the habits of the closely related Prairie Chicken. In agricultural regions of Illinois, Prairie

Chickens often resort to fields planted to forage crops or small grains. When, however, the growth of vegetation eventually hides one bird from another, the males will make vertical leaping flights as high as 4–5 feet—presumably to keep in visual contact with the other birds as well as to be better seen themselves (Ralph Yeatter, personal communication). The Hamerstroms (personal communication, 1953) have also noticed that Prairie Chicken cocks make jump flights, particularly when new birds arrive, and that when the cover is high, the jumps are high (2–4 feet), and when cover is sparse, the jumps are often low (1-2 feet).

The northern Ontario muskeg embraces three main vegetation types: blocks of close grown stunted spruce or stands of open grown tamarack; brushy areas on hummocky moss- and lichen-covered ground (fig. 2); and water-logged grass and sedge areas which in the vicinity of lakes and ponds extend out for some distance over the surface of the water as a floating sedge mat. The first type obviously does not provide dancing grounds; the latter two types either lack a firm enough substrate or, from the standpoint of unobstructed vision, seemingly would not provide adequate display grounds. Yet for this species, visual psychic stimulation appears to be of paramount importance for breeding success. The visual as well as the substrate problem appears to have been solved by the muskeg sharp-tails of northern Ontario by resorting to the use of vegetational pedestals or tussock mounds, as shown in fig. 3. This photograph was taken on July 1, 1947, about 10 miles up the Lawabiskau River, a stream flowing into James Bay 20 miles south of the mouth of the Albany River. About a dozen performing birds were seen. These birds, insofar as could be told before flushing, and later by inspection of the area, were making use of these sedge mounds. Although note was not taken of the fact at the time, the photograph suggests that the sedge on the top of the mound was trimmed by plucking as well as trampled to create the saucer-like depression. A ramp, formed of trampled vegetation, can be seen leading up to this elevated platform. Many of these tussock mounds support small and very stunted black spruce by virtue of their slight elevation above the surrounding water-logged sedge vegetation. A male specimen collected from the tussock figured was shot in the early afternoon. The presence of birds on the dancing grounds at this time of day is probably related to the heavy overcast at the time.

In Wisconsin, Prairie Chickens are also known to boom on tussocks. "One booming ground which has about six inches of water each spring, has persisted since at least 1939, with the cocks using the tussocks and lodged mats intensively and flattening the tops with their feet" (the Hamerstroms, personal letter, 1953).

Snyder (1935) discounted a food shortage as a factor causing the emi-

gration from the Hudson Bay-James Bay region in 1932, stating that the birds collected during the flight were in good physical condition. In fact, the main plant foods eaten by Sharp-tailed Grouse (Schmidt, 1936; Swanson, 1940; Grange, 1948; Hamerstrom and Hamerstrom, 1951) are so omnipresent in the "Great Muskeg" that a food shortage seems inconceivable. For example, buds, leaves, catkins, or fruits of the following are taken: tamarack, junipers, willows, aspens, *Myrica gale*, alders, white birch, bog birch, roses, brambles (*Rubus*), dogwood, leatherleaf, bearberry, small

Fig. 4. The Attawapiskat River at a point about 35 miles inland from the coast of James Bay, Ontario. Note black spruce on the higher ground of the natural levees along the river.

cranberry, as well as numerous herbaceous plants. All these plants, and in some cases many related species, occur more or less abundantly in the muskeg or its associated forest edge along the major streams. Fall movements and concentrations of Sharp-tailed Grouse in the muskeg area as a whole are more likely a part and result of seeking heavier timber cover in advance of the winter than a food shortage *per se*. When the much more limited and well protected timbered sites, which occur chiefly in linear patterns along the rivers (fig. 4), become crowded in years of cyclic peaks as the result of shifts in habitat by local populations, as well as limited migra-

tional movements of more northerly populations, it is more readily appreciated how simple population pressure in combination with migratory unrest could precipitate a mass emigration.

In conclusion, it would seem that the above findings offer support for the opinion expressed by the Hamerstroms (1951, p. 208) that "the great bulk of evidence, however, indicates that sharp-tails do not need grain. It is possible that sharp-tails require either grains as food or woody vegetation for shelter to get through the winter—that a highly concentrated diet may make up for a deficiency in cover."

Literature Cited

Anon.
1947 Geology and economic minerals of Canada. Canada Dept. of Mines and Resources. Ottawa. No. 2478 (3rd ed.). 357 pp. (See pp. 184–188, "The Hudson Bay Lowland," by J. F. Caley).

Bent, A. C.
1932 Life histories of North Ameriean gallinaceous birds. *U. S. Natl. Mus. Bull.* 162.

Grange, W. B.
1948 Wisconsin grouse problems. Wis. Cons. Dept. Pub. 328, Madison.

Hamerstrom, F. N.
1939 A study of Wisconsin prairie chicken and sharp-tailed grouse. *Wilson Bull.*, 51:105–120.

Hamerstrom, F. N., Jr., and F. Hamerstrom
1951 Mobility of the sharp-tailed grouse in relation to its ecology and distribution. *Amer. Mid. Nat.*, 46:174–226.

Hamerstrom, Frederick and Frances, and O. E. Mattson
1952 Sharptails into the shadows. Wisconsin Wildlife 1. Game Management Division. Wis. Cons. Dept.

Hanson, H. C., and R. H. Smith
1950 Canada geese of the Mississippi flyway, with special referenee to an Illinois flock. *Ill. Nat. Hist. Surv. Bull.* 25(3):67–210.

Hart, C. M., O. S. Lee, and J. B. Low
1950 The sharp-tailed grouse in Utah. Its life history, status and management. Pub. 3, Fed. Aid Div. Utah State Dept. Fish & Game.

Hellmayr, C., and B. Conover
1942 Catalogue of birds of America. *Field Mus. Nat. Hist. Zool. Ser.* 13, Part 1, No. 1.

Manning, T. H.
1952 Birds of the west James Bay and southern Hudson Bay coasts. *Natl. Mus. Canada. Bull.*, No. 125.

Mayr, E.
1950 Speciation in birds. Proc. 10th Intern. Ornith. Cong., Uppsala, pp. 91–131.

Schmidt, F. J.
1936 Winter food of the sharp-tailed grouse and pinnated grouse in Wisconsin. *Wilson Bull.* 48:181–204.

Schorger, A. W.
1944 The prairie chicken and sharp-tailed grouse in early Wisconsin. *Trans. Wis. Acad. Sci.*, 35:1–59.
Snyder, L. L.
1935 A study of the sharp-tailed grouse. *Contrib. Royal Ontario Mus. Zool.*, 6:1–66.
Swanson, G.
1940 Food habits of the sharp-tailed grouse and analysis of droppings. *Journ. Wildl. Mgt.* 4:432–436.

Illinois Natural History Survey, Urbana, Illinois. June 23, 1953

NEW LIFE MEMBER

Whitney H. Eastman was born at Fort Ann, New York, on April 24, 1888. A graduate of Dartmouth College, he is Vice President of General Mills, Inc. His deep interest in bird study has resulted in his acquiring a life-list of 749 species, which includes the Ivory-billed Woodpecker. A pair of these birds, which he located in Florida in March, 1950, were the first to be found in that state since 1924. He was instrumental in the establishment of a sanctuary for the pair. He maintains active membership in many ornithological societies and is on the National Executive Board of the Boy Scouts of America.